Practice: 360 - Waste Facility Closure

Scenario: #1 - Not pumpable, not converted to freshwater storage

Scenario Description:

This practice scenario includes the decommissioning of an earthen liquid waste impoundment (embankment or excavated type) where the estimated volume of waste to be removed is approximately 15% liquid/slurry waste and 85% sludge/solid waste of the the total storage capacity of the structure. The waste impoundment will not be converted to freshwater storage. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors.
Associated practices: Nutrient Management (590), Critical Area Planting (342)

Before Situation:

An existing lagoon or waste storage pond is no longer functioning correctly or is not being used for its intended purpose. The consistancy of the sludge/solid waste is too wet to be spread with conventional spreader and too solid to be agitated and pumped to sprinkler or tanker disposal vehicles. It poses a safety hazard for humans and livestock and is a threat to environmentally sustainability by the potential for impacts to water and air quality.

After Situation:

This scenario assumes an earthen waste impoundment, with top dimensions of 395 ft x 220 ft, 12 ft total depth with 3:1 side slopes. The total volume is approximately 20,000 cubic yards (volume below spillway). The volume of solid waste to be removed is approximately 85% of the storage volume (85% X 20,000 = 17,000 CY). The sludge/solid waste will be removed from the impoundment using heavy earthmoving equipment and will be land applied. Stockpiling of the solid waste for drying may be needed to obtain a suitable moisture content prior to land application. The volume of earthwork (earthfill and excavation) required to breach the embankment and/or fill in the impoundment and perform final grading of the site is approximately 50% of the total volume. The volume of earthwork to be paid on the placement of compacted earthfilll based on 50% of the total volume, which is 10,000 CY.

Structural removal, as necessary, may include the removal and disposal of the synthetic liner, sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. Decommissioning of a liquid waste storage impoundment includes agitating, removing, and spreading liquid/slurry waste material, removing solid/sludge waste remaining in the bottom. All waste material shall be land applied in accordance with Nutrient Management (590). If present, the synthetic liner will be removed and properly disposed of.

All inflow devices and associated appurtenances will be removed and properly disposed of. The waste impoundment shall be breached and have compacted earthfill placed to the extent required to return the site to pre-existing conditions or provide drainage from the site. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Closure of the waste impoundment will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment. The site will also become available for another use.

Monitoring wells may be needed in certain situations to comply with regulatory requirements.

Scenario Feature Measure: Storage Volume

Scenario Unit: Cubic Foot

Scenario Typical Size: 540,000

Scenario Cost: $178,844.90 **Scenario Cost/Unit:** $0.33

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Spreading, manure sludge	1633	Loading, hauling and spreading manure solids/sludge by ground equipment on nearby fields. Includes equipment, power unit and labor costs.	Cubic Foot	$0.29	459000	$133,110.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.73	10000	$37,300.00
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$97.05	8	$776.40
Manure, compost, injection	956	Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs.	Gallon	$0.01	605880	$6,058.80
Labor						

Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.11	8	$144.88
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$23.61	8	$188.88

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$415.40	2	$830.80
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$217.57	2	$435.14

Practice: 360 - Waste Facility Closure

Scenario: #2 - Pumpable, not converted to freshwater storage

Scenario Description:

This practice scenario includes the decommissioning of an earthen liquid waste impoundment (embankment or excavated type) where the estimated volume of waste to be removed is approximately 85% liquid/slurry waste and 15% sludge/solid waste of the the total storage capacity of the structure. The waste impoundment will not be converted to freshwater storage. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors.
Associated practices: Nutrient Management (590), Critical Area Planting (342)

Before Situation:

An existing lagoon or waste storage pond is no longer functioning correctly or is not being used for its intended purpose. The consistancy of the waste is such that it can be agitated and pumped to a sprinkler or tanker disposal vehicles. It poses a safety hazard for humans and livestock and is a threat to environmentally sustainability by the potential for impacts to water and air quality.

After Situation:

This scenario assumes an earthen waste impoundment, with top dimensions of 395 ft x 220 ft, 12 ft total depth with 3:1 side slopes. The total volume is approximately 20,000 cubic yards (volume below spillway). The volume of liquid waste to be removed is approximately 85% of the storage volume (85% X 20,000 = 17,000 CY(3,433,320 gallons)). The sludge/solid waste remaining after pumping operations will be removed from the impoundment using heavy earthmoving equipment and will be land applied. The volume of earthwork (earthfill and excavation) required to breach the embankment and/or fill in the impoundment and perform final grading of the site is approximately 50% of the total volume. The volume of earthwork to be paid on the placement of compacted earthfilll based on 50% of the total volume, which is 10,000 CY.

Structural removal, as necessary, may include the removal and disposal of the synthetic liner, sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. Decommissioning of a liquid waste storage impoundment includes agitating, removing, and spreading liquid/slurry waste material, removing solid/sludge waste remaining in the bottom. All waste material shall be land applied in accordance with Nutrient Management (590). If present, the synthetic liner will be removed and properly disposed of.

All inflow devices and associated appurtenances will be removed and properly disposed of. The waste impoundment shall be breached and have compacted earthfill placed to the extent required to return the site to pre-existing conditions or provide drainage from the site. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Closure of the waste impoundment will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment. The site will also become available for another use.

Monitoring wells may be needed in certain situations to comply with regulatory requirements.

Scenario Feature Measure: Storage Volume

Scenario Unit: Cubic Foot

Scenario Typical Size: 540,000

Scenario Cost: $97,499.30 **Scenario Cost/Unit:** $0.18

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Manure, compost, injection	956	Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs.	Gallon	$0.01	3433320	$34,333.20
Spreading, manure sludge	1633	Loading, hauling and spreading manure solids/sludge by ground equipment on nearby fields. Includes equipment, power unit and labor costs.	Cubic Foot	$0.29	81000	$23,490.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.73	10000	$37,300.00
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$97.05	8	$776.40
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$23.61	8	$188.88

Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.11	8	$144.88

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$217.57	2	$435.14
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$415.40	2	$830.80

Practice: 360 - Waste Facility Closure

Scenario: #3 - Not pumpable, convert to freshwater storage

Scenario Description:

This practice scenario includes the decommissioning of an earthen liquid waste impoundment (embankment or excavated type) where the estimated volume of waste to be removed is approximately 15% liquid/slurry waste and 85% sludge/solid waste of the the total storage capacity of the structure. The waste impoundment will be converted to freshwater storage. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors.
Associated practices: Nutrient Management (590), Critical Area Planting (342)

Before Situation:

An existing lagoon or waste storage pond is no longer functioning correctly or is not being used for its intended purpose. The consistancy of the sludge/solid waste is too wet to be spread with conventional spreader and too solid to be agitated and pumped to sprinkler or tanker disposal vehicles. It poses a safety hazard for humans and livestock and is a threat to environmentally sustainability by the potential for impacts to water and air quality.

After Situation:

This scenario assumes an earthen waste impoundment, with top dimensions of 395 ft x 220 ft, 12 ft total depth with 3:1 side slopes. The total volume is approximately 20,000 cubic yards (volume below spillway). The volume of solid waste to be removed is approximately 85% of the storage volume (85% X 20,000 = 17,000 CY). The sludge/solid waste will be removed from the impoundment using heavy earthmoving equipment and will be land applied. Stockpiling of the solid waste for drying may be needed to obtain a suitable moisture content prior to land application. Additional excavation below the existing bottom of the pond is necessary to remove potential contaminants, this is assumed to be 10% of the total volume or 2,000 CY.

Structural removal, as necessary, may include the removal and disposal of the synthetic liner, sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. Decommissioning of a liquid waste storage impoundment includes agitating, removing, and spreading liquid/slurry waste material, removing solid/sludge waste remaining in the bottom. All waste material shall be land applied in accordance with Nutrient Management (590). If present, the synthetic liner will be removed and properly disposed of.

All inflow devices and associated appurtenances will be removed and properly disposed of. The waste impoundment shall be breached and have compacted earthfill placed to the extent required to return the site to pre-existing conditions or provide drainage from the site. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Closure of the waste impoundment will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment. The site will also become available for another use.

Scenario Feature Measure: Storage Volume

Scenario Unit: Cubic Foot

Scenario Typical Size: 540,000

Scenario Cost: $145,129.50 **Scenario Cost/Unit:** $0.27

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Manure, compost, injection	956	Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs.	Gallon	$0.01	605880	$6,058.80
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$2.00	2000	$4,000.00
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$97.05	8	$776.40
Spreading, manure sludge	1633	Loading, hauling and spreading manure solids/sludge by ground equipment on nearby fields. Includes equipment, power unit and labor costs.	Cubic Foot	$0.29	459000	$133,110.00
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.11	8	$144.88

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$23.61	8	$188.88

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$217.57	2	$435.14
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$415.40	1	$415.40

Practice: 360 - Waste Facility Closure

Scenario: #4 - Pumpable, convert to freshwater storage

Scenario Description:

This practice scenario includes the decommissioning of an earthen liquid waste impoundment (embankment or excavated type) where the estimated volume of waste to be removed is approximately 85% liquid/slurry waste and 15% sludge/solid waste of the the total storage capacity of the structure. The waste impoundment will be converted to freshwater storage. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors.
Associated practices: Nutrient Management (590), Critical Area Planting (342)

Before Situation:

An existing lagoon or waste storage pond is no longer functioning correctly or is not being used for its intended purpose. The consistancy of the waste is such that it can be agitated and pumped to a sprinkler or tanker disposal vehicles.It poses a safety hazard for humans and livestock and is a threat to environmentally sustainability by the potential for impacts to water and air quality.

After Situation:

This scenario assumes an earthen waste impoundment, with top dimensions of 395 ft x 220 ft, 12 ft total depth with 3:1 side slopes. The total volume is approximately 20,000 cubic yards (volume below spillway). The volume of liquid waste to be removed is approximately 85% of the storage volume (85% X 20,000 = 17,000 CY(3,433,320 gallons)). The sludge/solid waste remaining after pumping operations will be removed from the impoundment using heavy earthmoving equipment and will be land applied. Additional excavation below the existing bottom of the pond is necessary to remove potential contaminants, this is assumed to be 10% of the total volume or 2,000 CY.

Structural removal, as necessary, may include the removal and disposal of the synthetic liner, sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. Decommissioning of a liquid waste storage impoundment includes agitating, removing, and spreading liquid/slurry waste material, removing solid/sludge waste remaining in the bottom. All waste material shall be land applied in accordance with Nutrient Management (590). If present, the synthetic liner will be removed and properly disposed of.

All inflow devices and associated appurtenances will be removed and properly disposed of. The waste impoundment shall be excavated to the extent required to convert the structure to a freshwater pond. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Closure of the waste impoundment will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment. The site will also become available for another use.

Scenario Feature Measure: Storage Volume

Scenario Unit: Cubic Foot

Scenario Typical Size: 540,000

Scenario Cost: $63,783.90 **Scenario Cost/Unit:** $0.12

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Spreading, manure sludge	1633	Loading, hauling and spreading manure solids/sludge by ground equipment on nearby fields. Includes equipment, power unit and labor costs.	Cubic Foot	$0.29	81000	$23,490.00
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$2.00	2000	$4,000.00
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$97.05	8	$776.40
Manure, compost, injection	956	Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs.	Gallon	$0.01	3433320	$34,333.20
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$23.61	8	$188.88

Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.11	8	$144.88

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$415.40	1	$415.40
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$217.57	2	$435.14